From Seeds to Shoreline Engaging Students in Salt Marsh Restoration Water Education Summit, Chattanooga, TN

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Goal: Students will understand the importance of the salt marsh ecosystem through involvement in a student-action environmental education project.

Objective: The From Seeds to Shoreline Program will provide students with the opportunity to learn about and actively participate in salt marsh restoration, including the collection, germination and cultivation and planting of Spartina alterniflora to areas along the SC coastline.

Original Guinea Pigs (2010 – 2011):

Murray LaSaine Elementary Mitchell Elementary

William Reeves Elementary Cario Middle

Ashley Hall Homeschool

James Island Middle School James Island High School

Transplanting Locations:

Palmetto Islands County Park, SC DNR, Daniel Island













In The Beginning....

The Motivation:

- -Search for SC salt marsh restoration project for students
- -North Carolina Coastal Federation
- -2010 partnerships with Clemson and SC DNR

Partner Project

- -SC Sea Grant: Grant Support, Scholastic Expertise, Curriculum
- -Clemson University: Greenhouse, Curriculum, Water Quality Expertise
- -SC DNR: Scientific Expertise (process protocol, ecology, restoration experience, etc), aligning with oyster reef restoration efforts (SCORE) and Coastal Discovery Program











1. Fall (September – October): flowers

- 2. Fall (October November): goes to seed
- *collection of seeds
- 3. Fall Winter (November March): dormant period
- *store collected seeds in wet/cool conditions
- *plant seeds/germinate in greenhouse
- 4. Spring Summer (March August): germination/growth *transplant seedlings

Mother Nature's Timeline vs. The Academic School Year



1.

2.



4.

















Teacher Workshop Goals

- I. Understand the importance of the salt marsh ecosystem
- II. Understand the purpose of the From Seeds to Shoreline Project
- III. Empower teachers to conduct the project
 - professional development opportunity
 - -provide "start up" materials/kits
 - -ideas for supplemental activities
 - -support during 2013-2014 school year
 - -reflection in 2014 on project











S2S Teacher Workshops

	Teachers	Workshops	•	County Representation
2012	15	1	3	12 Coastal, 3 Inland
2013	27	3	1	24 Coastal, 3 Inland





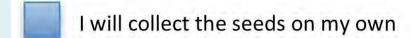


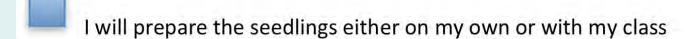
Choose Your Own Adventure (CYOA)

Step One: Collecting and Storing Seeds

Timeframe: late October/early November

Collecting *Spartina alterniflora* seeds requires a trip to the saltmarsh and a few minutes time to harvest the seeds during late October to early November. Preparing the seeds should occur as soon as possible after the seeds are collected to keep the seeds viable and to increase successful germination rates. Seeds are collected by cutting the seed head off the stalk. The seeds then need to be removed and stored in tap water in a plastic sandwich bag in the refrigerator for 6-8 weeks.





- I need the seeds provided to me
- I need assistance with storing seeds

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From Seeds to Shoreline Teacher Timeline						
S2S Steps	Summer	Fall	Winter	Spring	Notes	
Workshop Training	Attend Training; Create Plan for 2013-2014 School Year	Adapt CYOA; Communicate w/ Contact Person		Provide feedback on project when requested		
Educational Lessons	Review and identify lessons for class	Implement appropriate lessons				
Step 1: Seed Collection	Learn process; Adapt CYOA	Collect Seeds				
Step 2: Seed Storage	Learn process; Adapt CYOA	Store Seeds in Moist/Cool Environment	Check storage is moist and cool			
Step 3: Germination/ Cultivation	Learn process; Adapt CYOA		Germinate seeds In warm, moist conditions	Germinate seeds In warm, moist conditions		
Step 4: Restoration	Learn process; Identify Spring Restoration Date	Schedule Spring Restoration Day with Contact Person		Participate in Restoration Day		



Step 1: Seed Collection (October – November)







Planting of Seeds (January – February)























Germination/Cultivation (January – March)

















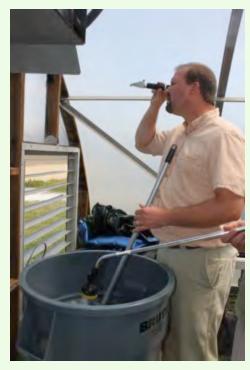




**Acclimation (2 Weeks Prior to Transplanting)











Restoration Day! Transplanting (April – June)











Restoration Day! Transplanting Adjacent to Oyster Reefs (April – June)









S2S Growth from 2011 to 2013

Year	Schools	Students
2011	8	600
2011-2012	12	800
2012-2013	18	1200
2013-2014	33	TBD

















Take Home Messages

- Make Student Involvement Projects Repeatable for teachers and other facilitators
- Provide planning tools and suggested timelines
- Partner Communication can be tricky, establish methods beforehand
- Encourage opportunities for expansion, such as in cooperating other programs or student research on existing program





The Future Current Goals of From Seeds to Shoreline

- Continue to Refine the Spartina alterniflora restoration process
 - -increase success rate
 - -quantify positive impact
- II. Enhance educational context
 - -identify appropriate lessons for use
 - a) topics aligned with standards
 - b) STEM
 - c) investigation topics
- III. Empower teachers to conduct the project
 - -professional development opportunity
 - -provide "start up" materials/kits
 - -support during 2013-2014 school year
 - *reflection piece in 2014 on project















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